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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/672,701	09/26/2003	Yoshihiro Sudo	ALPSP132	9240
22434	7590	09/12/2005	EXAMINER	
BEYER WEAVER & THOMAS LLP			JONES, DIANE ELIZABETH	
P.O. BOX 70250			ART UNIT	
OAKLAND, CA 94612-0250			PAPER NUMBER	
			2862	
DATE MAILED: 09/12/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/672,701

Applicant(s)

SUDO ET AL.

Examiner

Diane E. Jones

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☒ Claim(s) 1 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 10/672,701.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 1 is objected to as being indefinite. Lines 21-22 recite the limitation of "connecting a GMR device provided at a position closer to said point of origin" without stating what it is closer than; Lines 26-27 recite the limitation of "a position farther from said point of origin within said one block and a GMR device provided at a position farther from said point of origin within said other block" without defining what is farther than. The claim has been examined with the understanding that the positions cited are with respect to a particular GMR device closer to/farther than the point of origin than the other GMR device within that block. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al. (6640652 B2) in view of Tokunaga et al. (6175296 B1).

2. With respect to Claim 1, Kikuchi et al. disclose a rotation angle detecting device (rotation angle sensor, Col. 2, Line 28 and Fig. 1) comprising:

a rotating shaft (rotation shaft, Col. 4, Lines 30-32 and Fig. 1, Item 23);

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a fixed portion where a plurality of GMR devices are provided (fixed part, Col. 4, Lines 18-21 and Fig. 1, Items 21 and K1-K4);

a rotating portion for forming a magnetic field and rotating facing said fixed portion (rotating part with magnet, Col. 4, Lines 22-24 and Fig. 1, Item 22); and

a Wheatstone bridge circuit formed by connecting said GMR devices (Wheatstone bridge, Col. 6, Lines 63-65 and Fig. 4-5); wherein,

with the center of said rotating shaft as the point of origin ((the magnet is a disk (Col. 4, Line 22) on the rotating part (Col. 4, Line 22) which includes the shaft (Col. 4, Lines 30-33) and GMR elements are arranged symmetrically with respect to a point facing the center of the magnet, Col. 7, Lines 53-65)) and imaginary axial lines perpendicularly intersecting at this point of origin as the X axis and Y axis (directions x and y, Fig. 2),

each of four blocks sectioned by said X axis and Y axis have provided therein a pair of GMR devices disposed parallel to said X axis or Y axis (boards K1 and K2 are parallel to each other in the x direction (Col. 6, Lines 51-53 and Fig. 2) and each board contains two elements (Col. 6, Lines 53-58 and Fig. 2, Items R1 and R2), and boards K3 and K4 are parallel to each other in the y direction (Fig. 2, blocks K3 and K4)), and such that the GMR devices provided in one block are symmetrical across the point of origin with the GMR devices provided in another block facing the block across the point of origin (K1 and K2 are symmetrical about center point and K3 and K4 are symmetrical about the center point, Col. 7, Lines 53-65 and Fig. 2, Items K1-K4). Kikuchi et al. further teach that the GMR elements are arranged to form a Wheatstone bridge circuit

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which has a resistance formed by serially connecting a GMR device within one block and a GMR device within said other block (R1 and R4 are connected in series, Col. 7, Line 7 and Fig. 4), and a resistance formed by connecting a GMR device in one block and a GMR device in said other block (R3 and R2 are connected in series, Col. 7, Line 8 and Fig. 4) with the resistances connected in parallel (R1 and R3 are in parallel with input terminal 8, R2 and R4 are in parallel with ground 11, Col. 6, Line 66 to Col. 7, Line 6 and Fig. 4).

Kikuchi et al. lack the teaching that the two GMR devices which are serially connected have geometrical positions centered about the origin.

Tokunaga et al. teach a rotation angle detecting device (potentiometer that detects the angle of rotation, Col. 3, Line 37 and Fig. 2) which comprises a Wheatstone bridge circuit (Wheatstone bridge with four GMR devices, Col. 4, Lines 18-22 and Fig. 7) which has a resistance formed by serially connecting a GMR device provided at a position closer to said point of origin (elements 31 and 32 are disposed on line L1, elements 33 and 34 are disposed along line L2, elements 31 and 33 face each other, elements 32 and 34 face each other Col. 10, Lines 3-13, thus centering the elements about a center point of the Wheatstone bridge) within one block and a GMR device provided at a position closer to said point of origin within said other block (element 31 is connected in series to element 34, Col. 11, Lines 16-18 and Fig. 7), and a resistance formed by serially connecting a GMR device provided at a position farther from said point of origin within said one block and a GMR device provided at a position farther from said point of origin within said other block (element 32 is connected in series to

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element 33, Col. 11, Lines 19-21 and Fig. 7, with the resistances connected in parallel (31b is connected to 33b and an input terminal 41 is conducted to 40 (Col. 11, Lines 5-10 and Fig. 7) and 32b is connected to 34b and an input terminal 48 is conducted to 47 (Col. 11, Lines 10-15 and Fig. 7). Tokunaga et al. also teach that the center of the bridge circuit should coincide with the center line of the rotating portion (Col 3, Lines 61-67) in order to obtain a higher output (Col. 3, Lines 35-40).

It would be obvious to one skilled in the art at the time of the invention to use the centering method of Tokunaga et al. to orient the GMR elements within the two Wheatstone bridges of Kikuchi et al. about the origin of the fixed portion, and to establish the origin along the axial line of the rotating shaft in order to obtain a higher output.

3. With respect to Claim 2, Kikuchi et al. teach that the direction of fixed magnetism of said GMR devices is the same direction for each GMR device in a pair within a block (GMR elements of K1 and K2 are parallel to each other and the magnetism of R1 and R2 is in the +y direction, Col. 6 Lines 51-60 and Fig. 2, Items K1, K2, R1 and R2) and is formed opposite for blocks symmetrical across said point of origin (magnetism of R3 and R4 is in -y direction, Col. 6, Lines 60-62 and Fig. 2, Items K1, K2, R3 and R4).

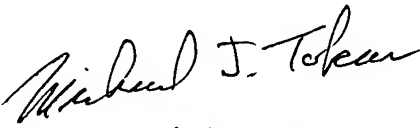
Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. 6927566B2, 5686837, 6882145B2, 6920684 B2 as disclosing rotation sensors using GMR devices in Wheatstone bridge configurations.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Diane E. Jones. The examiner can normally be reached on M-F.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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